Human Reproductive System

Produces, stores, nourishes and transports functional gametes (egg and sperm).

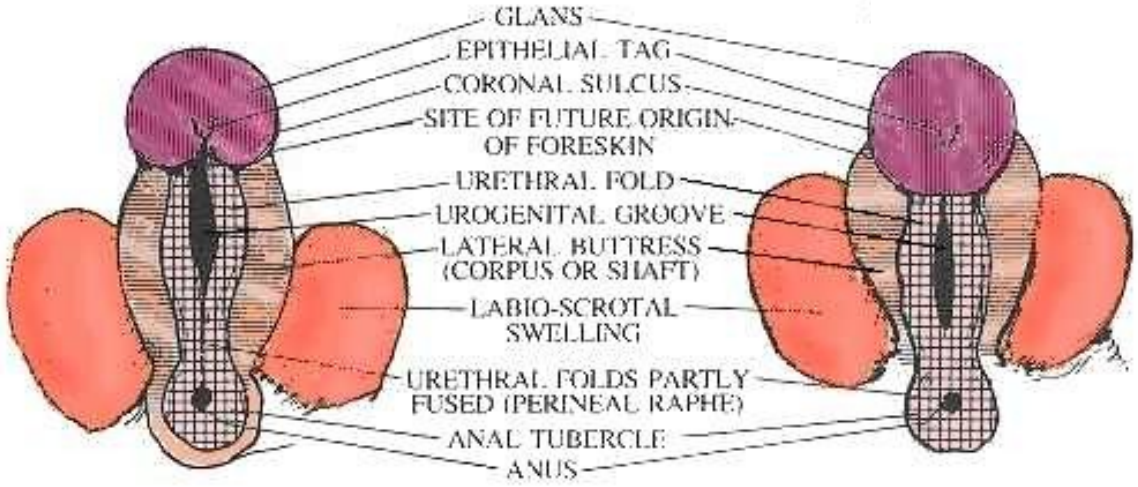
Fertilization - union of sperm and egg = zygote.

Structures

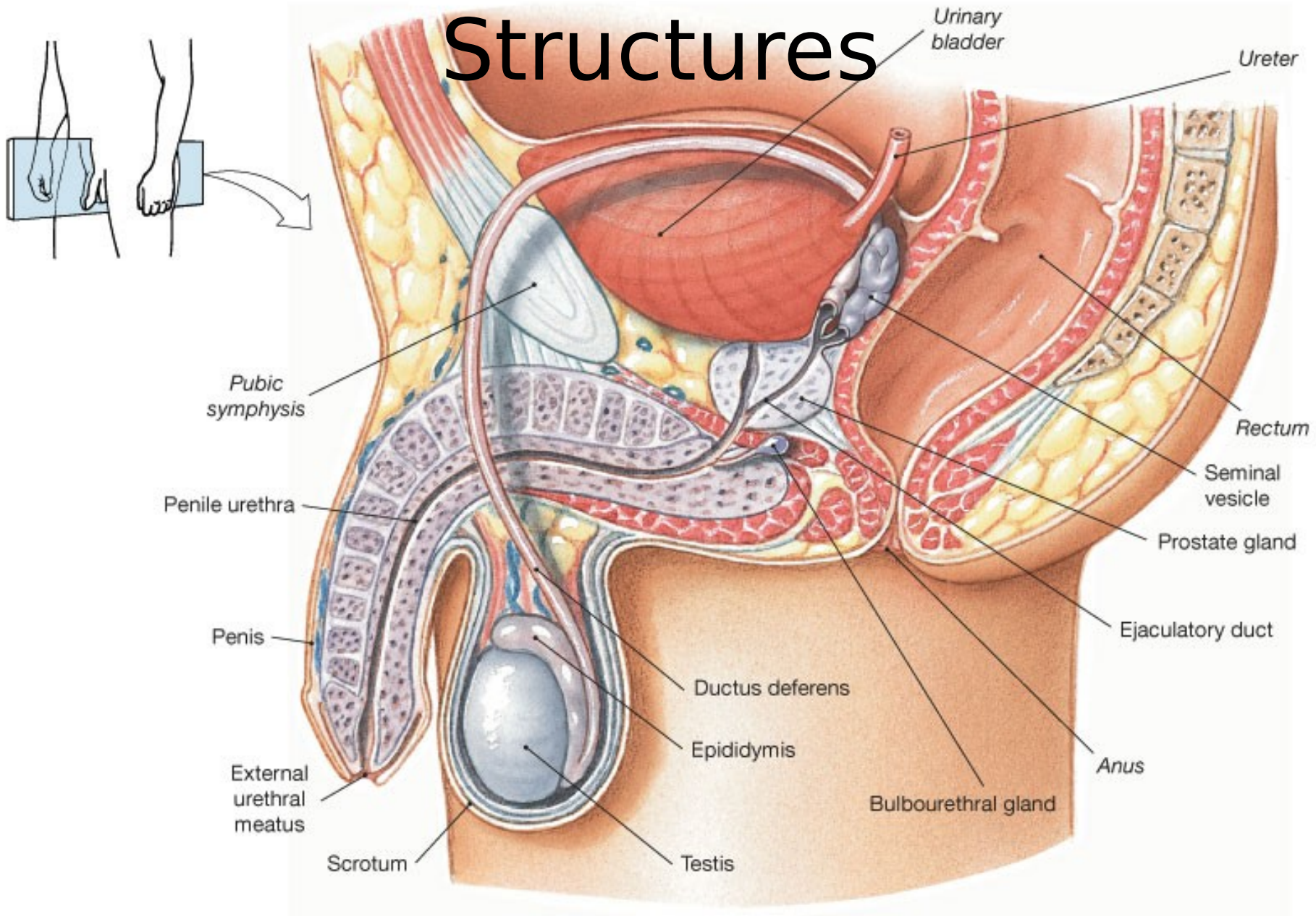
- Gonads – make gametes + Sex Hormones
- Ducts – gametes and fluid travel through.
- Accessory Organs and Glands
- External Genitalia

- **Male Gonads = Testes**
  - Produce Sperm (male gametes)
  - Testosterone
- **Female Gonads = Ovaries**
  - Eggs (female gametes)
  - Estrogen and Progesterone

EIGHT WEEKS AFTER CONCEPTION



Male Reproductive Structures

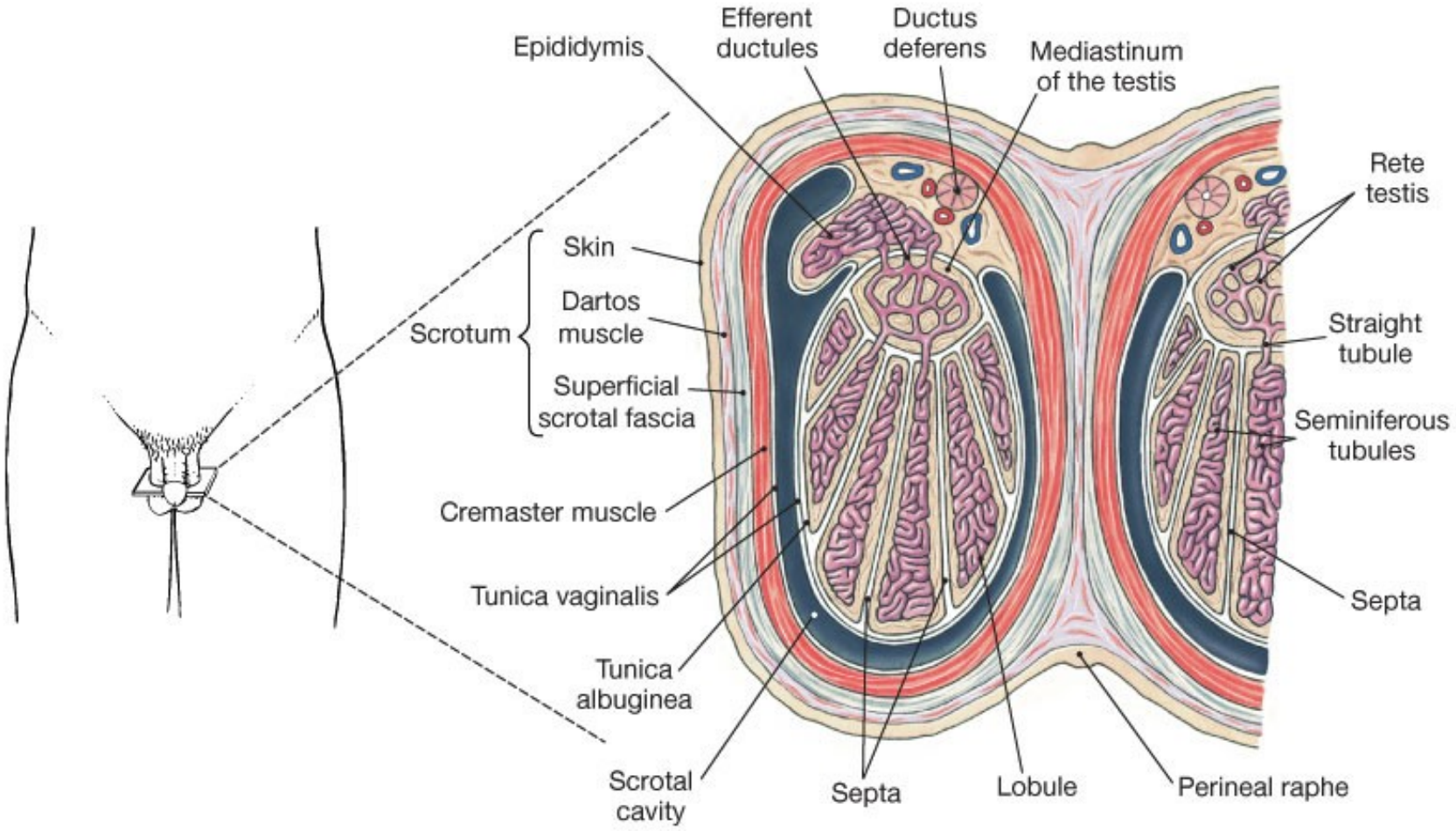


Male Reproductive Structures

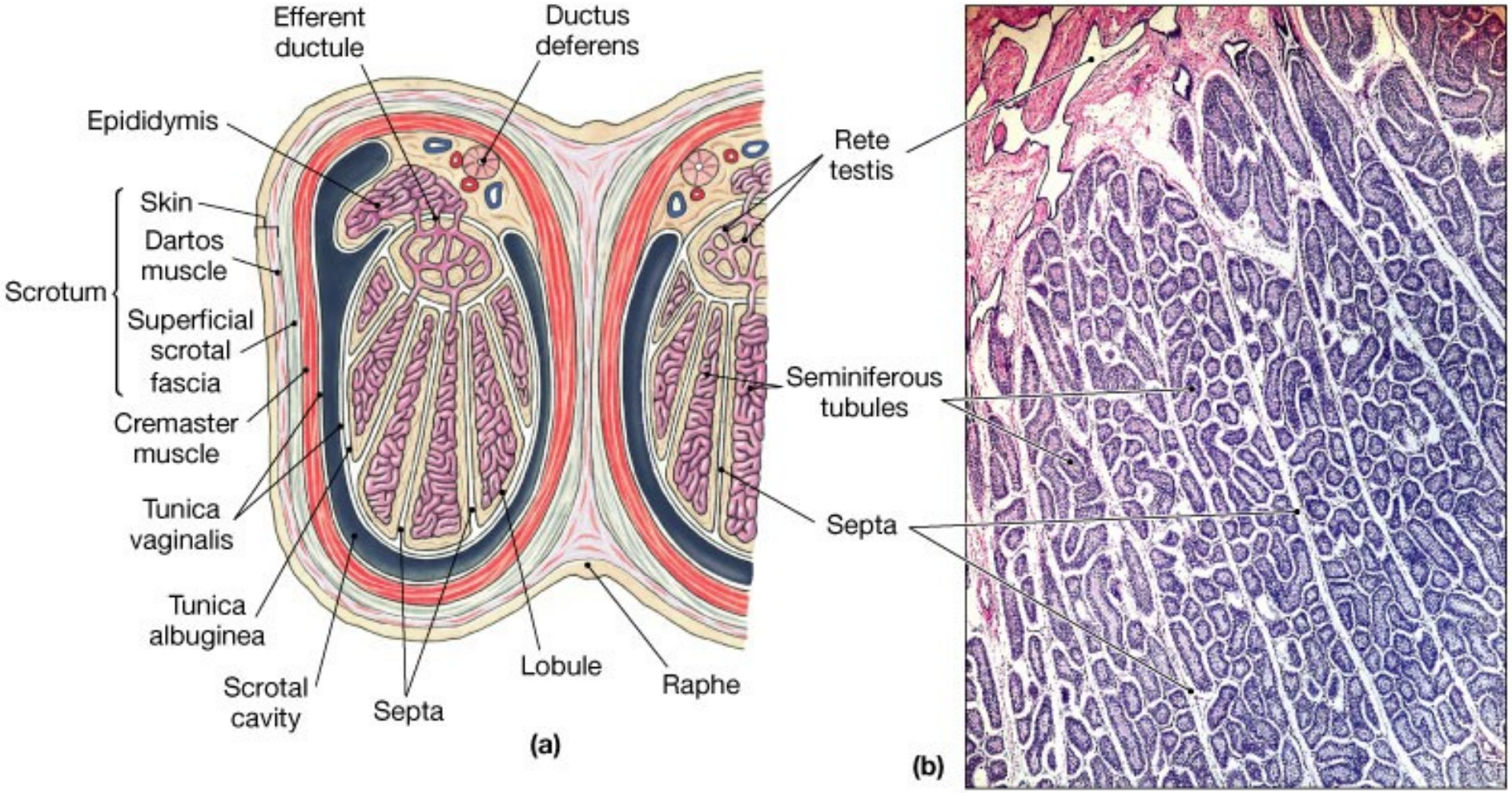
1º Reproductive organ: Testes

- Scrotum - encloses testes.
- Dartos muscle:
- Cremaster muscle:
- Sperm must be 2-3º F cooler than rest of body, hence kept ‘outside’ in scrotum.

Structure of the Testes



Structure of the Testes

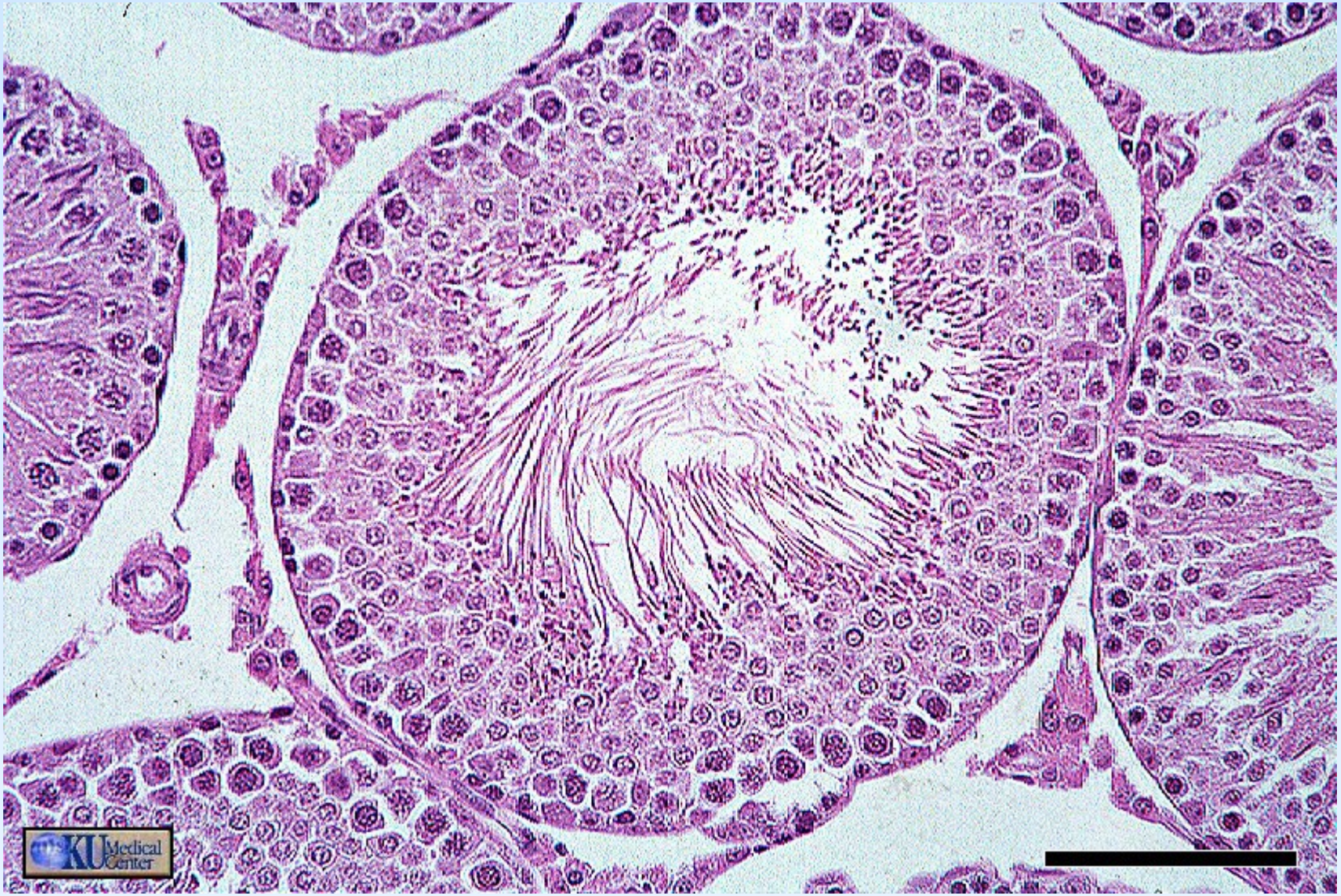


Seminiferous Tubules

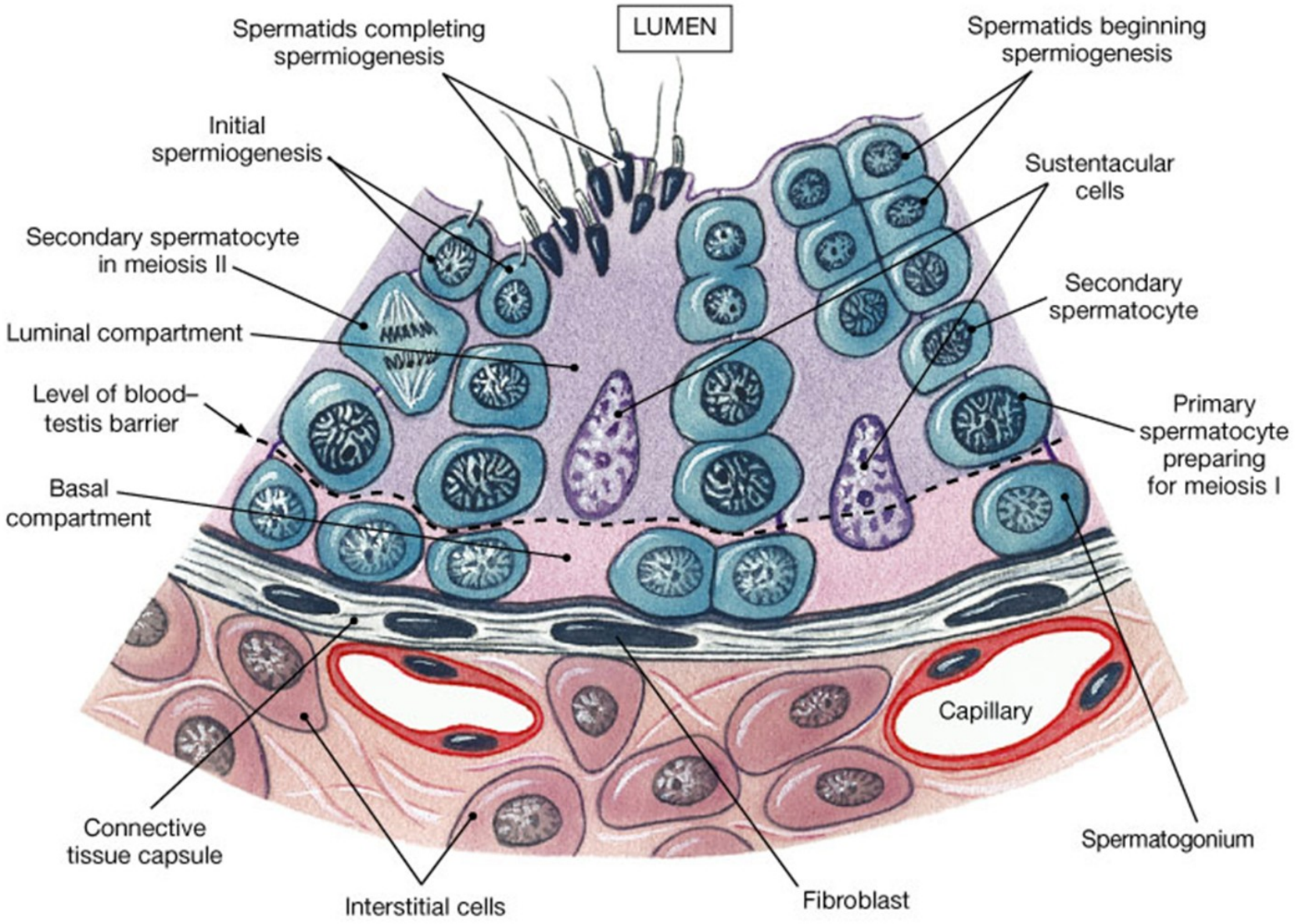
- Site of sperm cell production - spermatogonia (stem cells)

- Interstitial cells - make and secrete testosterone.

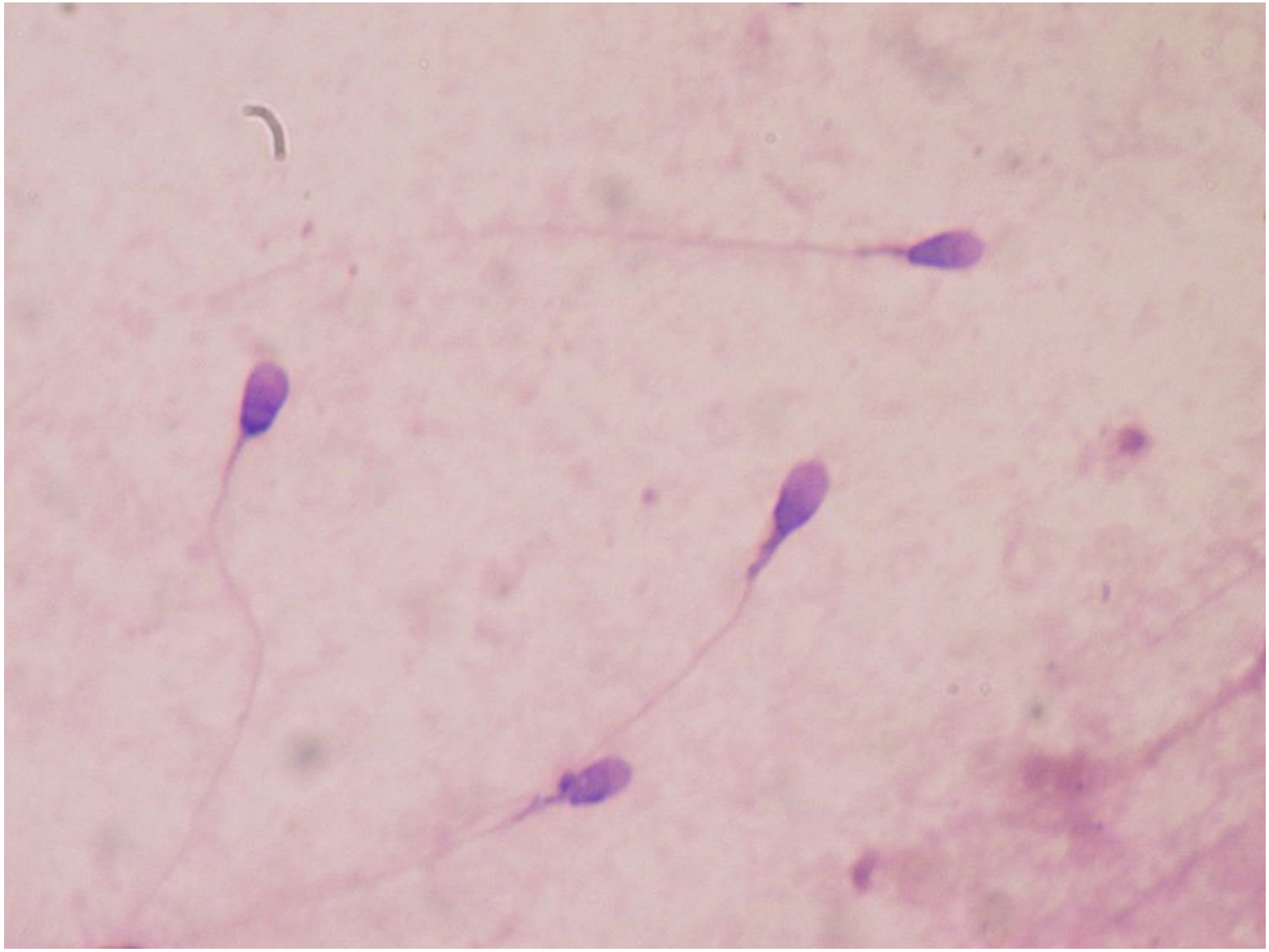
Seminiferous Tubules of the Testes with interstitial cells in between



Spermatogenesis



Mature Sperm Cells

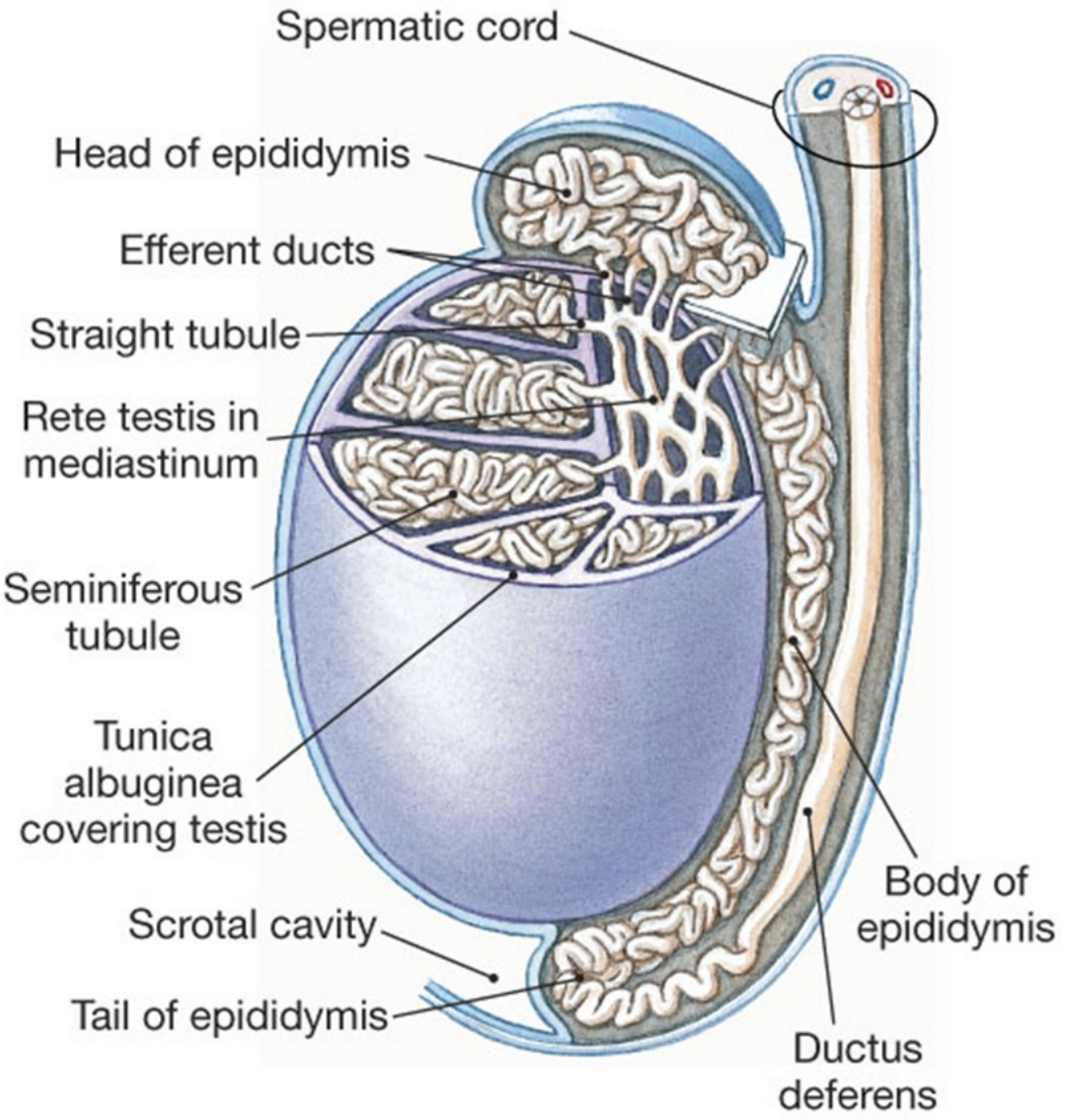


Epididymis – about 18 feet long *(3 weeks)*.

- Head
- Body
- Tail

Transport & Maturation of Sperm cells and culling

Ductus defere

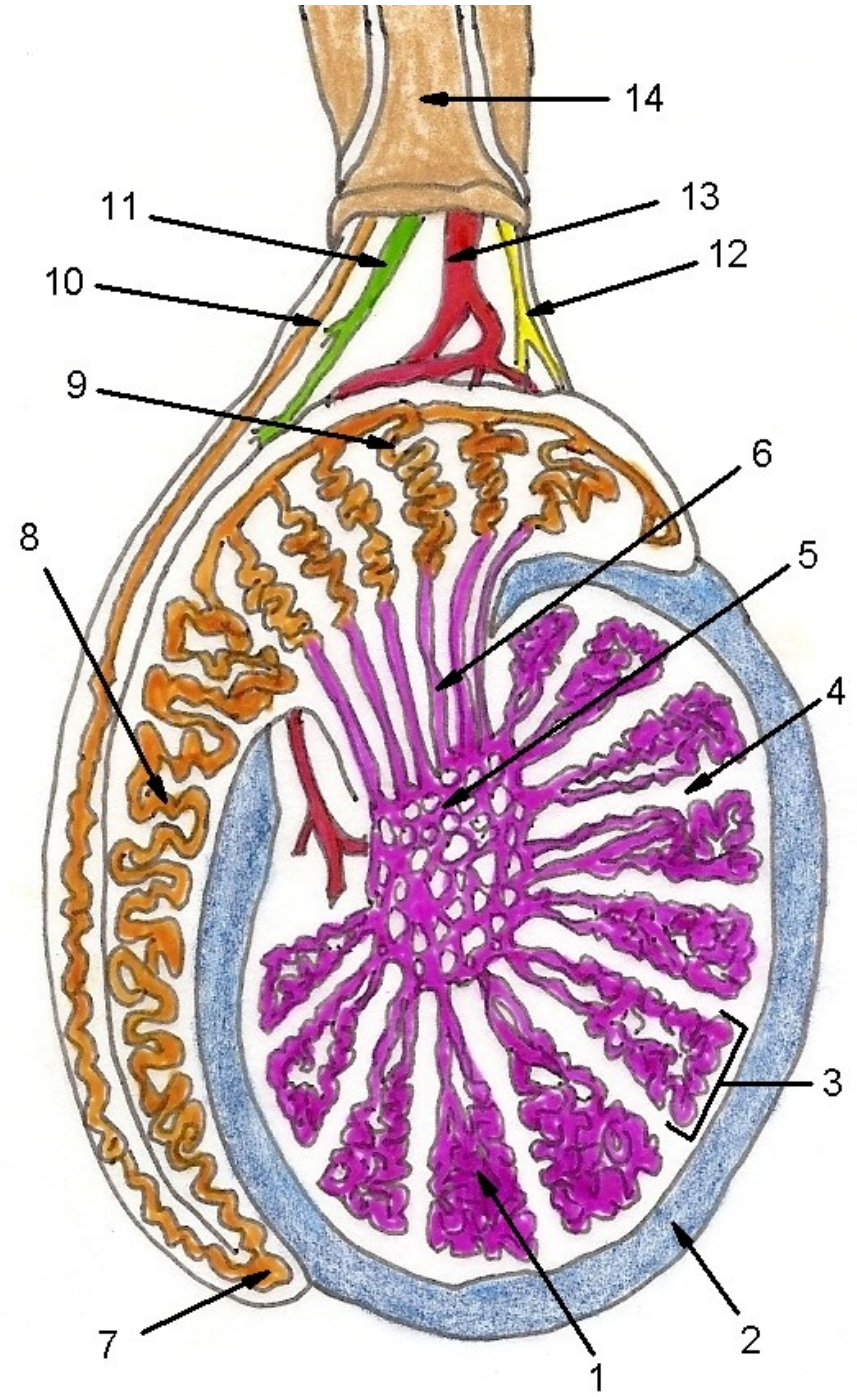


Testis and epididymis

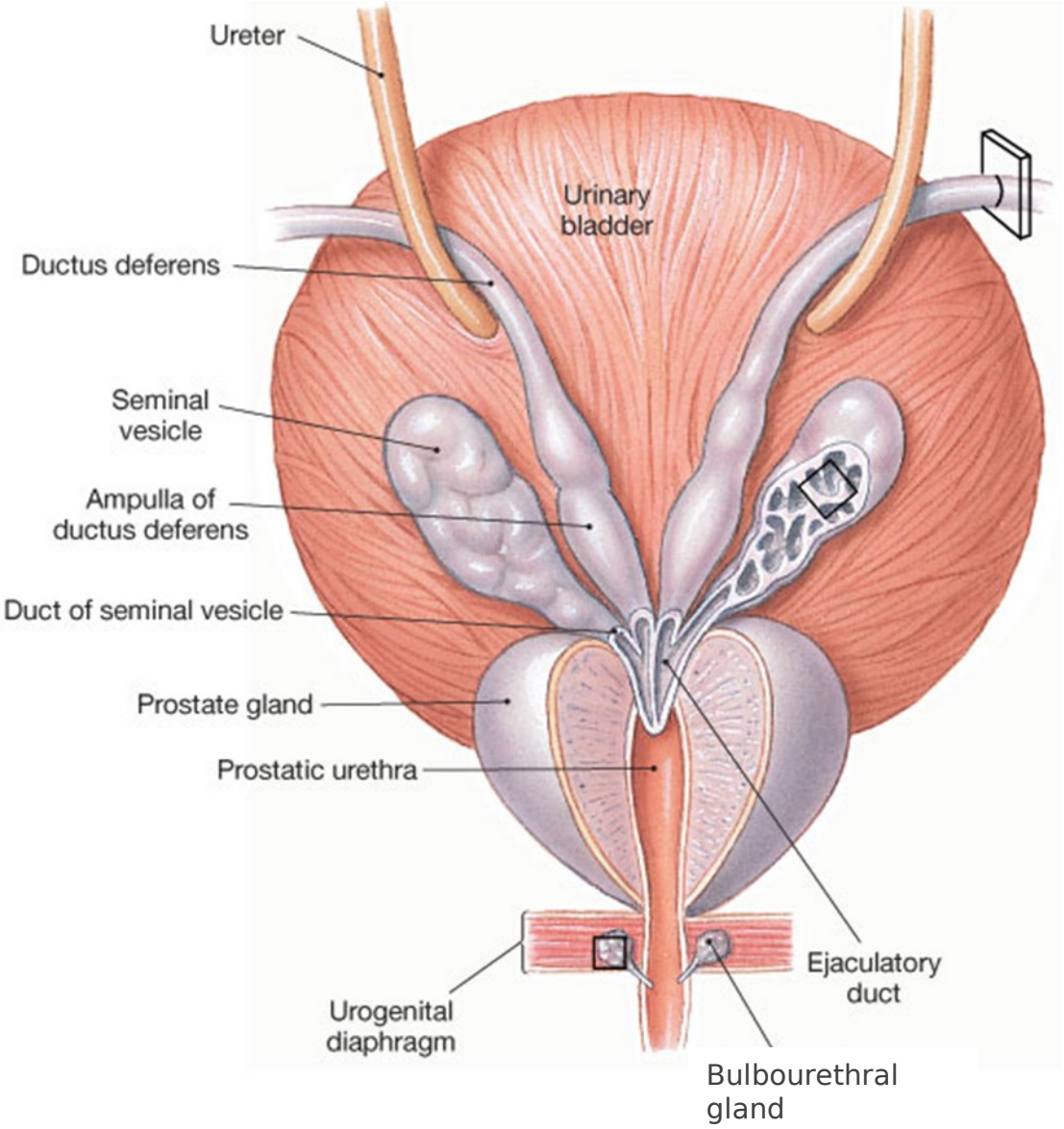
Ductus Deferens

- Muscular tube transports/stores sperm.
- Passes through inguinal canal to Abdomen.
- Fuses into ejaculatory duct (see upcoming figure).
- Empties into urethra (3 parts in male).

1. Seminiferous tubules
2. Tunica albuginea
3. Lobule of testis
4. Testicular septum
5. Rete testis
6. Efferent ductule
7. Tail of epididymis
8. Body of epididymis
9. Head of epididymis
10. Ductus deferens
11. Lymphatic vessel
12. Testicular nerve
13. Testicular artery
14. Spermatic cord



The Accessory Glands



Posterior View

Accessory Organs of the Male

- Seminal vesicles
- Prostate gland
- Bulbourethral glands

Secrete semen into urethra

Seminal Vesicles

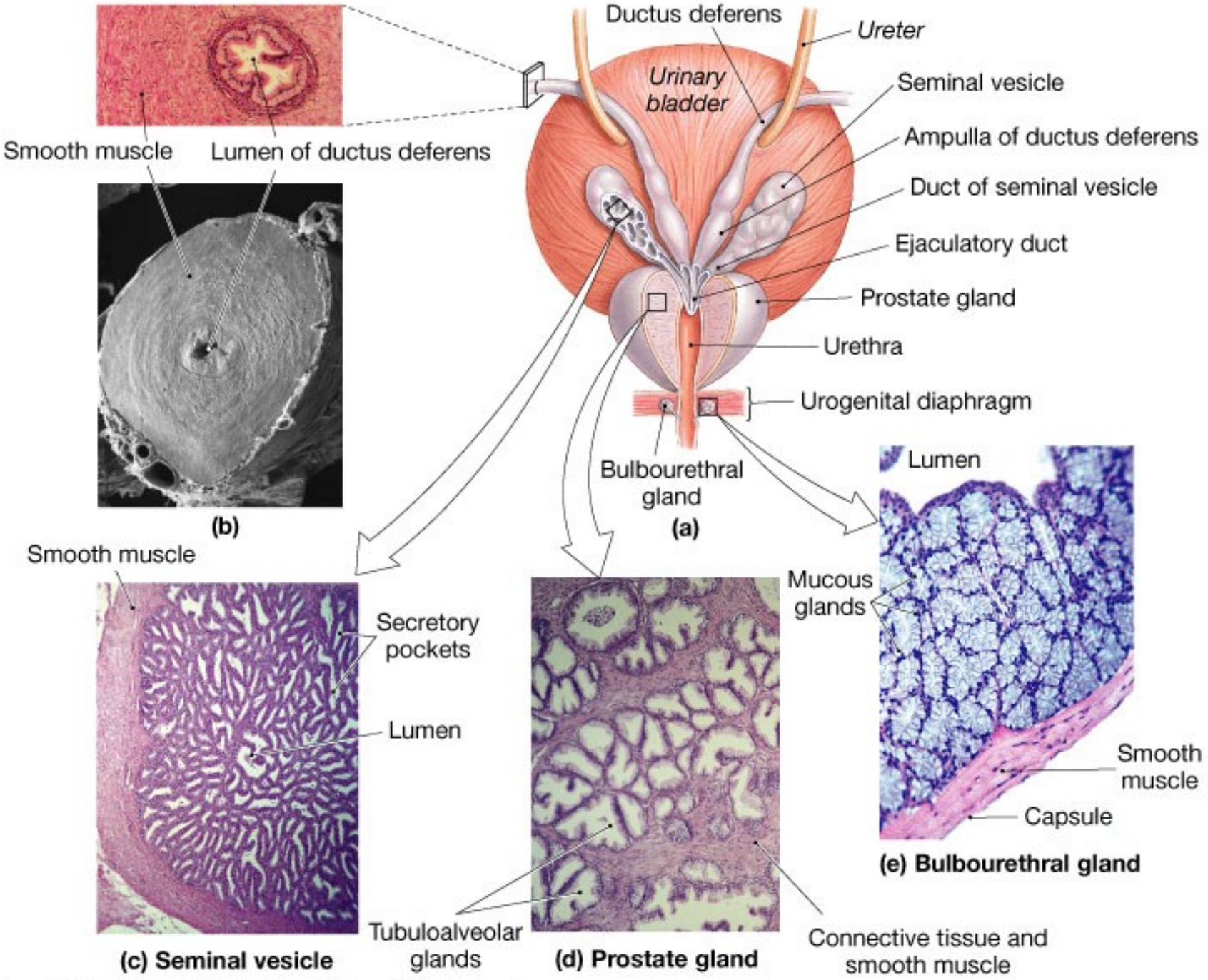
- Paired glands – secretes 60% semen volume.
- Fibrinogen – converts to fibrin.
- Fructose – a sugar for energy!
- Prostaglandins – contract female tract.

Prostate Gland

- Single gland - secretes 30% semen volume.
- Clotting enzymes – to cause initial clots.
- Fibrolysin – to liquefy clots.

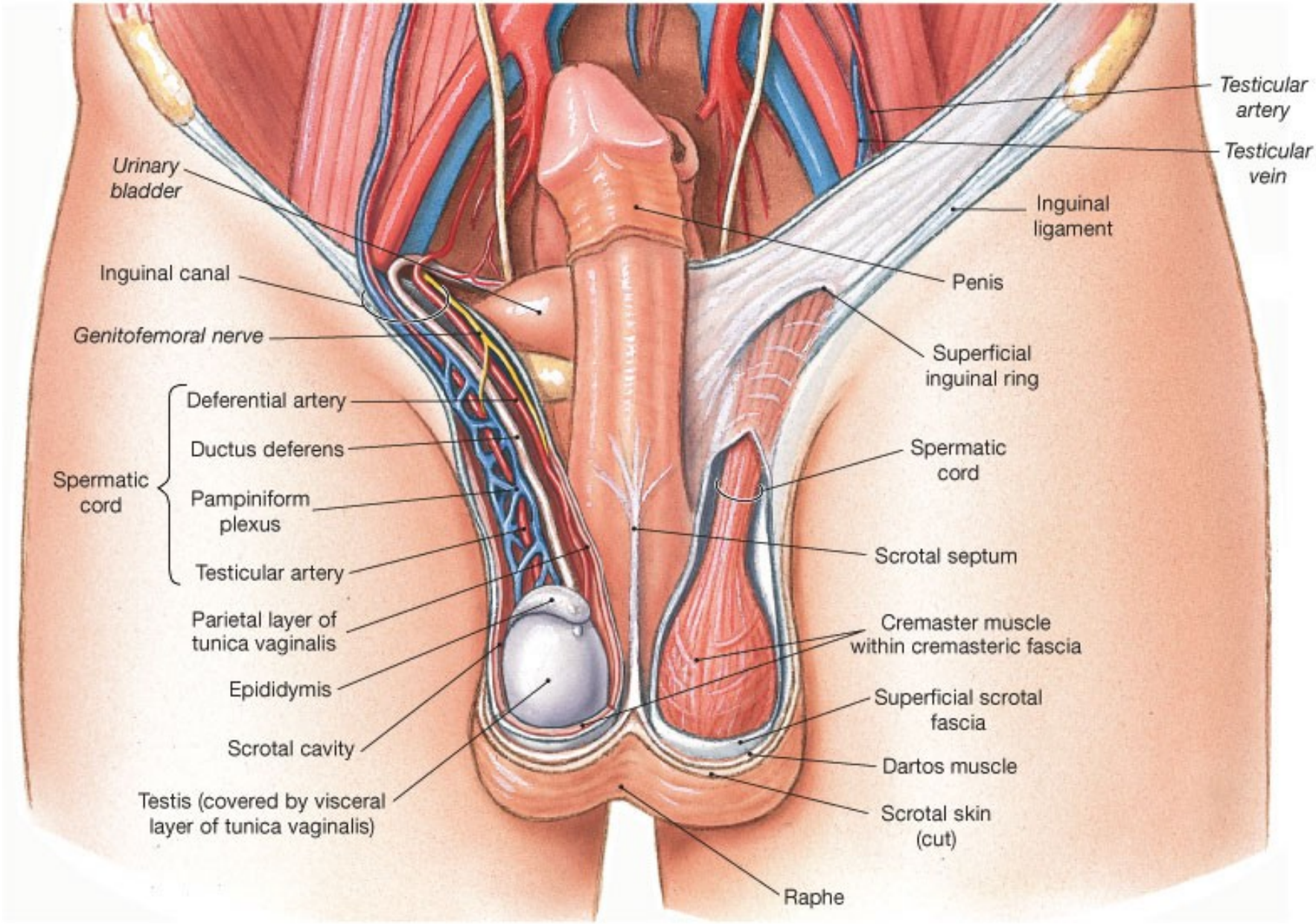
Bulbourethral Glands

- Paired glands (~5% semen volume).
- Alkaline mucus secretion (neutralizing).
- Lubricating properties.


Ductus deferens
Ureter
Urinary bladder
Seminal vesicle
Ampulla of ductus deferens
Duct of seminal vesicle
Ejaculatory duct
Prostate gland
Urethra
Urogenital diaphragm
Bulbourethral gland
(a)
Smooth muscle
Lumen of ductus deferens
(b)
Smooth muscle
Secretory pockets
Lumen
(c) Seminal vesicle
Tubuloalveolar glands
(d) Prostate gland
Connective tissue and smooth muscle
Lumen
Mucous glands
Smooth muscle
Capsule
(e) Bulbourethral gland

Semen

- Typical ejaculation releases 2-5 ml.
- Sperm count typically 50 – 100 million per ml.
- Sperm count below 20 million/ml = “infertile”.
- Typical pH range from 7.2 to 7.8 (alkaline or basic).


Testicular artery
Testicular vein
Urinary bladder
Inguinal ligament
Penis
Inguinal canal
Genitofemoral nerve
Superficial inguinal ring
Deferential artery
Ductus deferens
Spermatic cord
Pampiniform plexus
Testicular artery
Spermatic cord
Scrotal septum
Parietal layer of tunica vaginalis
Cremaster muscle within cremasteric fascia
Epididymis
Superficial scrotal fascia
Scrotal cavity
Dartos muscle
Testis (covered by visceral layer of tunica vaginalis)
Scrotal skin (cut)
Raphe

The Spermatic Cord

Connective tissue, fascia and muscle.

<u>Encloses these structures</u>:

ductus deferens, testicular artery, testicular vein, cremaster muscle. Pampiniform plexus, lymphatics and nerves.

All these travel through inguinal canal.

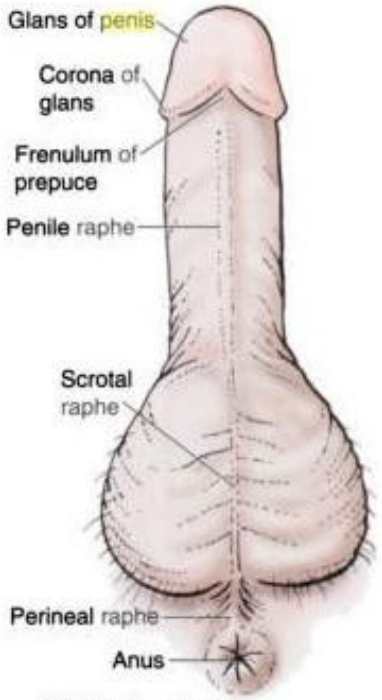
Male Urethra

- Urinary bladder to tip of penis
- Three regions
  - Prostatic urethra
  - Membranous urethra
  - Penile urethra
- Lined with stratified columnar and transitional epithelium.

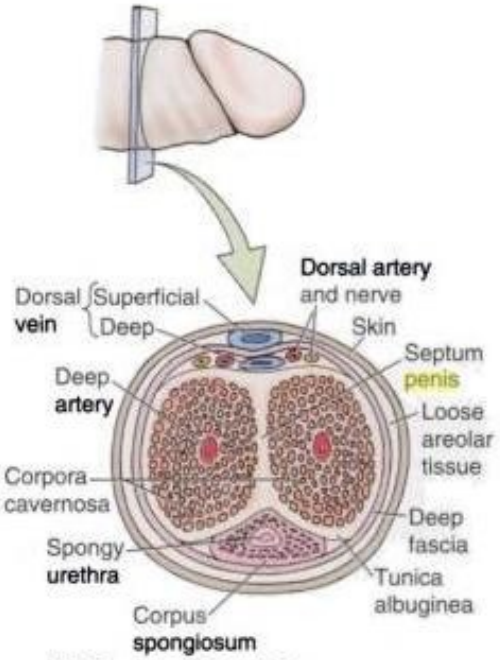
The Penis

- Root, body (shaft) and glans.
- Prepuce (foreskin) surrounds tip.
- Erectile tissue (3 masses)
  - Two **corpora cavernosa**
  - One **corpus spongiosum** (surrounds penile urethra)
- Erection – dilation of arterial smooth muscles.

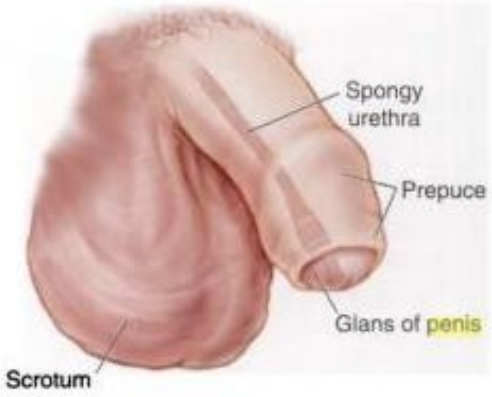
The Anatomy of the Penis



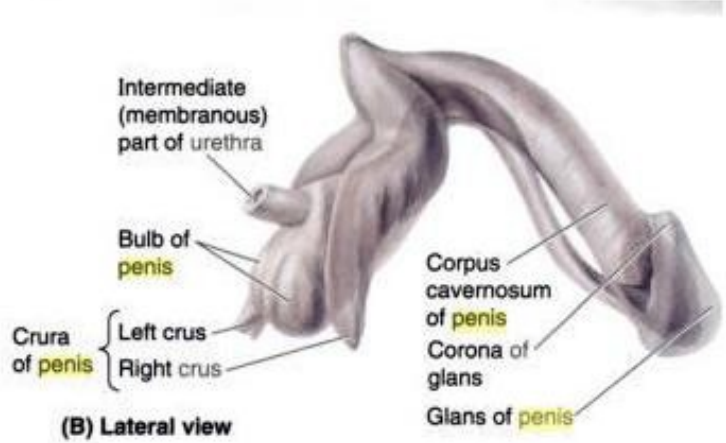
(A) Inferior view



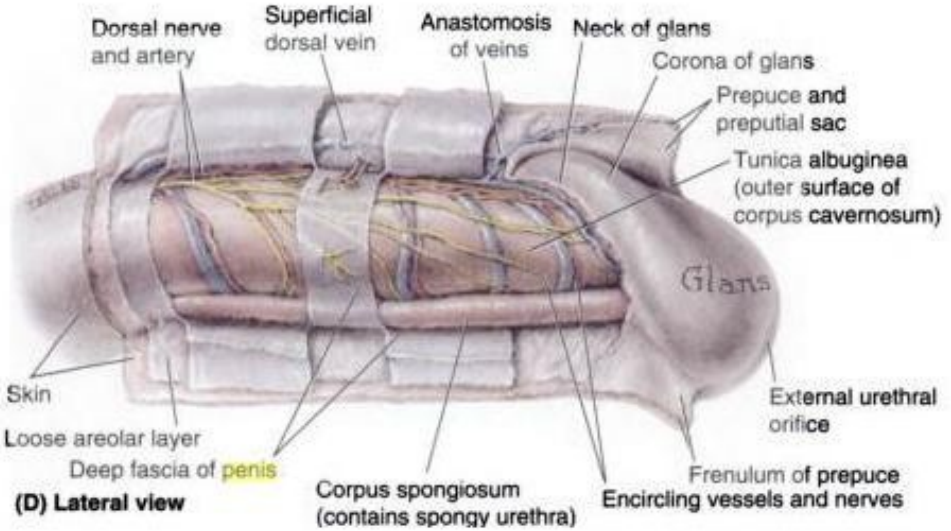
(C) Cross-sectional view



(E) Right anterolateral view

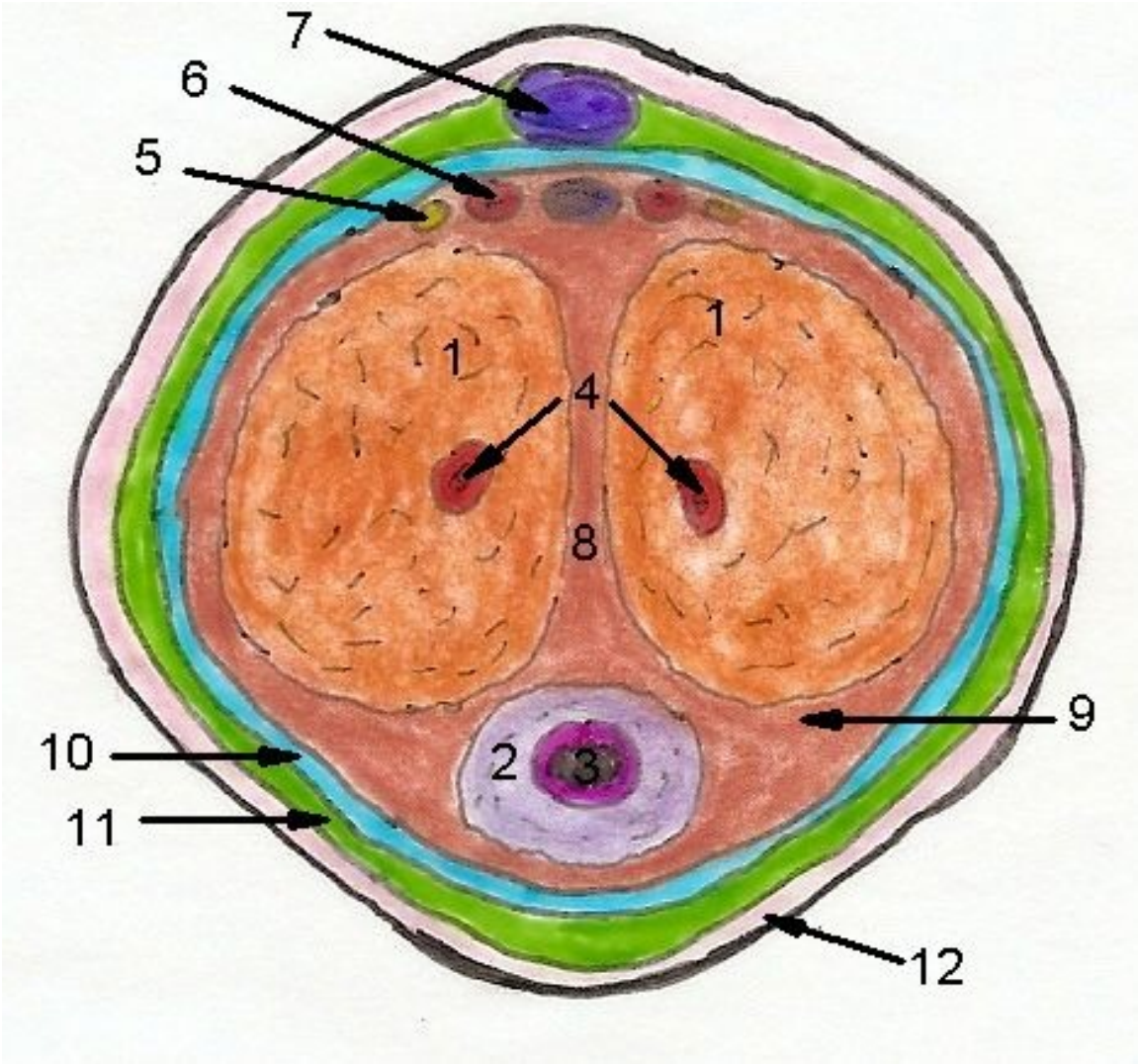


(B) Lateral view



(D) Lateral view

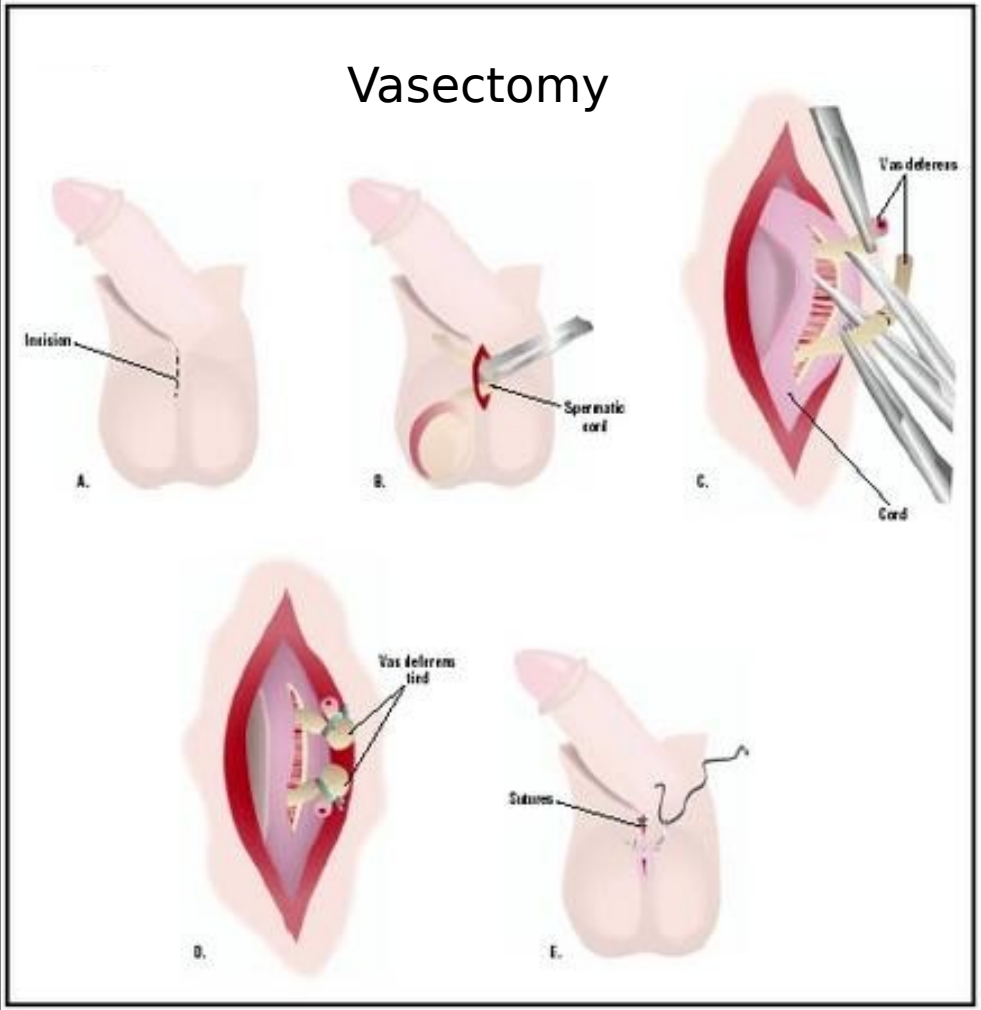
Cross Section of the Penis



Structures

1 Corpora cavernosa
2 Corpus spongiosum
3 Penile urethra
4 Deep artery
5 Doral nerve
6 Doral artery
7 Superficial dorsal vein
8 Septum of penis
9 Tunica albuginea
10 Deep fascia
11 Loose areolar CT
12 Skin of penis

Vasectomy


Incision
A.
Spermatic cord
B.
Vas deferens
Cord
C.
Vas deferens tied
D.
Sutures
E.